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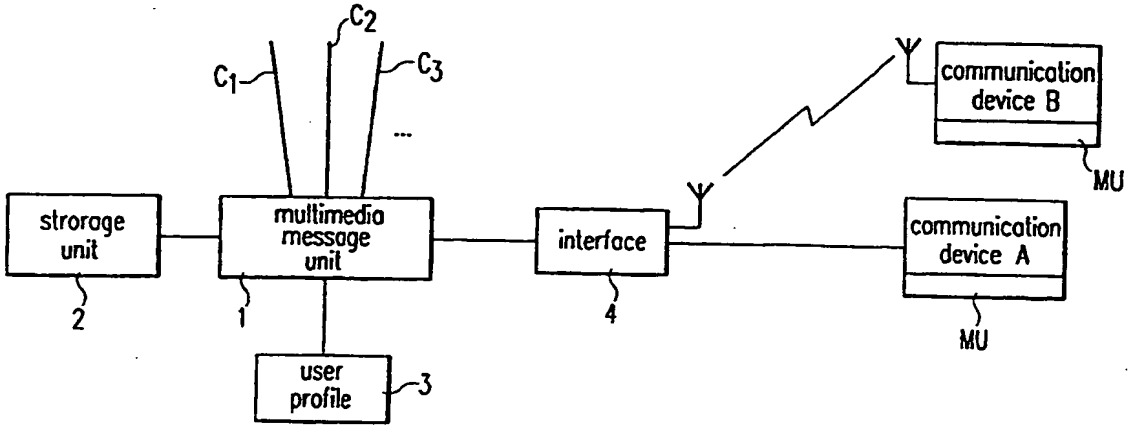
(54) Title: MULTIMEDIA SERVICE SYSTEM



(57) Abstract: The present invention relates to a multimedia message system (1, 2, 3, 4) for receiving, storing and managing messages of different media types received from different communication channels and for transmitting one or more specific messages to a selected communication device (A, B) via a single common interface of the system. The present invention further relates to a method for providing multimedia services, whereby messages of different media types are received from different communication channels, stored and managed, and whereby one or more specific messages are transmitted to a selected communication device via a single common interface. Further, the present invention relates to a computer program product adapted to perform the method according to the present invention when installed in one or more computing units of a multimedia service system.

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Multimedia Service System

The present invention relates to a multimedia service system which retrieves, stores and manages messages of different media types received from different media or communication channels and converts them to a data type of choice to be accessed by a user through a user communication device in a single session through a single interface on the basis of a specific data format or protocol.

The basis of the present invention is the idea, that the SMS (short message system) has been very successful in the second generation GSM telecommunication system. Mobile stations of the GSM system support this SMS service allowing messages to be displayed on the display of the mobile station without the intervention of the user or with the intervention of the user having received a notification of a received SMS message.

The object of the present invention is therefore to provide a multimedia system which allows a user to receive different data types or media elements, e.g. voice to data, fax to data, graphic oriented data, eMail, voice, in a preferred communication device as covenient and effective as possible.

This object is achieved by a multimedia service system according to claim 1 and a method according to claim 12. The above object is further achieved by a computer program product adapted to perform a method according to the present invention when installed in one or more computing units, i.e. servers, computers, laptops or the like, of a multimedia service system. The multimedia service system or multimedia messaging service according to the present invention provides the capabilities to centralize messages from different media, to prioritize messages and tasks based on user need's. The multimedia service system brings the concept of messaging anywhere, anyhow and anytime. Users are offered access options beyond voice mail, SMS, eMail and fax to retrieve, store and organize messages of different media types, such as voice, text, graphic, video, etc. in a single session from whatever device they may have at hand, e.g. mobile station, personal computer, laptop, etc. Hereby, the communication device needs to be among a qualified set of acceptable devices or terminals and determined network environments. The multimedia service system uses the registration information to provide location services to the user. The messages of different data types stored in the multimedia service system are transmitted to the communication device of the user through a single interface or protocol either automatically on the basis of predefined

parameters contained in the user profiles of the multimedia service system, or upon demand by a user. For example, the user profile of a certain user may define that certain data types are immediately forwarded after receipt from the multimedia service system to the respective communication device of this particular user (push-technique) without an intervention of the user to be necessary. On the other hand, the user may only receive certain data types upon a particular request (pull-technique). In this case, the user may receive a notification on his communication device that a specific data message has been received in the multimedia service system, or the user does not receive a notification but knows about the presence of a certain data message which he wants to retrieve.

The transmission of the data messages in the different data formats or media types is performed via a single common interface or adapted to a single transmission protocol so that a simple and effective transmission is achieved. For example, the single transmission protocol may define that all multimedia data, such as text, voice, image, video, eMail, SMS, etc. are transmitted in a graphic data format, such as MPEG 7.

The multimedia service system of the present invention is particularly advantageous in connection with a specifically designed memory unit for the communication device of the user. As stated above, the communication device can e.g. be a mobile station, a laptop, a personal computer or the like. The received multimedia data are advantageously stored in a detachable memory unit of the communication device. The detachable memory unit is designed to be used with various types of communication devices, so that e.g. video data received by a mobile station and stored in the detachable memory unit can later on by attaching the memory unit to a personal computer be viewed on the display of the personal computer. Hereby, a high effectivity, cost-effectiveness and user-friendliness is achieved. The communication device can also be a TV set, a video recorder or the like.

The transmission medium between the multimedia service system and the communication device can either be a wired connection or a wireless connection. An example for the wireless connection is e.g. the UMTS third generation of mobile telecommunication systems, which allows to introduce new services and new functionalities on the network side and the mobile terminal side. Thus, the present invention supports the transmission of various data types with multiple terminal types, multiple addresses and multiple access options. Hence, the multimedia service system needs the provisions for managing these multiple devices and message types.

The multimedia service system according to the present invention enables to organize all the different communication media types and allows users to bring their offices and their communication devices with them whereever they go. The multimedia service system supports existing and emerging technologies in the multimedia domain and complies with the new trends for mobile requirements. That includes the multimedia service on a non-real time basis. The multimedia service system according to the present invention and its multimedia assistance capability is geared towards assisting individual users (corporate or residential users) in the handling of their personalized methods based correspondence from/to single or more media, e.g. voice, fax, graphics, eMail, paging, etc., whenever it suits the user, whereever the user might be and whichever communication device he may use. The multimedia assistance capability of the multimedia service system provides the capabilities and the environment to suit the individual needs to react, invoke and transmit multimedia messages. The specific facilities for incoming/outgoing multimedia messages are: managing messages including filtering according to characteristics of the specific information, facilitate and adapt access from different terminal types; also requiring the techniques to store different sources and characteristics of media (such as using a detachable memory unit of the communication device), as well as recording/registering and retrieving on demand or asynchroneously, with respect to user profiles security for access, and privacy and data protection. The specific advantages and benefits are a high user comfort, a significant time saving (such as by automatic information retrieval, automatic search or automatic download), high cost-effectiveness and the improvement of quality and efficiency in being able of receiving, sending, distributing data or services while taking account of the terminal or communication device limitations. The requirements on the user's side are global access, automatic notification based on priority, authentication and connectivity. The system's requirements are a communication protocol, stores, retrieval and archiv model and techniques, user-friendly access, global access, filtering technique, download capability, registration and adaptation of a terminal, and management of network connection, availability and processing of message services.

The following description explains the multimedia service system and multimedia transmission method of the present invention in more detail, whereby figure 1 shows a bloc diagram of an example of a multimedia service system according to the present invention.

Thereby, the bloc diagram of Figure 1 shows a multimedia service system according to the present invention as comprising a multimedia service unit 1, i.e. a server, for managing and controlling the reception and the transmission of messages of different multimedia data types from and to different multimedia sources and from and to

different user communication devices A, B, a storage unit 2 connected to the multimedia service unit 1, a user profile unit 3 connected to the multimedia service unit 1 and a single interface unit 4 connected to the multimedia service unit 1. The interface unit 1 is connected on a wireless basis or on a wired basis to one or more user communication devices A, B. It is to be noted that the multimedia service system according to the present invention may consist of dislocated storage units, multimedia service units and user profile units, e.g. interconnected by a communication network as the internet or the like. One of the main features, however, is that the transmission of multimedia data to and from a user communication device is conducted via a single interface unit or on the basis of a single transmission protocol. For example, the message data of the different multimedia types may be transmitted in a format, such as MPEG 7.

The following description defines the stage 1 requirements of the multimedia messaging service system of the present invention. The multimedia service system operation needs to satisfy the requirements of both the user's and the service provider's. It needs to provide organisation tools, multimedia support of interoperability requirements, protocol conversions, directories, addressing scheme etc., incorporating network operators, service providers, terminal and network manufacturers. Seamless messaging across diverse networks and user groups shall assist in finding information when, where and how consumers need the multimedia service system.

The following specification contains the core requirements for the multimedia messaging service, which are sufficient to provide a complete service.

The specific objects of the multimedia service system are to meet the following requirements:

message management: To simplify the task of individuals message management from a plethora of message communication tool options. Thus incorporating a mechanism to centralize multiple media elements in a single message.

message storage: To provide a common message storage to enable dedicated user's handling (like review, access, creation and modification) of multimedia message elements from different terminal and network environments.

communication tools: To support seamless transmission between networks such as fixed, mobile and internet IP environments etc., to enable multiple access options from a single device, to enable integrated service - allow delivery options of multimedia messages such as i.e. voice, e-mail, voice mail, graphics etc. according to user's preferences, like i.e. e-mail to SMS, to fax or to voice. To enable integrated application, i.e. allow transmission of simultaneous media types, e.g. voice and fax, voice and image or the like or compounded messages i.e. image and drawings, to select alternative routing in overflow situation.

adaptation capabilities: To detect and adapt to the capabilities or limitations of terminals to match sender/recipient in terms of accessing contents, executing message services or storage, and to negotiate multimedia message formats or drop to base line text format.

reliability and dependability: Timely delivery and prompt response to users.

notification engine: To include delivery notification or automatic alert on new multimedia messages, and to provide the awareness of multimedia messages received, acknowledged, retrieved, stored, deleted etc., effecting the user's account and mailbox.

directory management: Handling of undeliverable multimedia messages (e.g. build in automatic central directory for unknown caller connection, or unregistered addresses), single directory for local and quick access for fax, internet/intranet use, ongoing built in directory from incoming multimedia messages, operation, administration and maintenance: include access control, user's registration, data privacy, remote monitoring, billing and virus protection, etc.

personalized multimedia service system configuration.

The above list of requirements for the multimedia service system of the present invention is not exhausted.

The following definitions are used in the present application:

Definitions

recipient: the entity capable of retrieving multimedia messages and information
sender: entity with the privilege to access multimedia messages and information
user: one who subscribes to multimedia service capability
message element: one message element consists only of information of a single media type, one or more message elements may form a multimedia message
multimedia message: a multimedia message bundles more than one message elements
multimedia message service: system which retrieves, stores and manages all the message types at a user's location through a single interface taking into account of integrating various forms of communication media from different message channels (voice mail, e-mail, fax etc.) and converts them to the media of choice to be accessed by the user in a single session from the selective communication device at hand at any time.

network: for the purposes of supporting multimedia messaging, the term network is applicable to the mobile operator's network and any entity which may exist outside the mobile operator's network, e.g. fixed intranet and multimedia technologies etc. enable multimedia messaging services.

High level requrirements

The following list gives the high level requirements of the multimedia message system or multimedia service system of the present invention. These are requirements which are independent of the user's perception of the service:

forward compatible multimedia messaging

consistent messaging

universal messaging access

reliability of multimedia message system

interoperability

minimum set of supported formats according to the level of service:
terminals which support multimedia message service shall provide a minimum set of supported formats to ensure full interoperability between different terminals and networks from the very beginning of service provisioning, as for example JPEG for pictures MP3 for audio, MPEG for motion pictures etc.

User and Multimedia Message System Requirements

User Requirements

The key elements expected by the user are :
Reliable connection/ availability of network
User friendly menu operations/convenience
Tailored services respecting cost saving ,and features complexity

The primary list of elements as needed by the user are defined as follows:
Message sorting and filtering according to user's profile/preferences/usage based on urgency, topic, sender etc.
Accessibility to be global, and retrieval, modification ,composure and transmission of Multimedia messages from defined set of terminals and network types, both mobile and fixed
Appropriate medium and message formats to convey message addressing effectively complying at least to user's preference of medium
Choice of medium to return receipts for message delivery as convened or to automatically link to information resources as required ,or to have visual access of sorted Multimedia messages via Web-based utility
Access authentication , and privacy of user-related information and avoidance of spam on the internet
Single bill for all Multimedia Message Systems, but itemised from the management viewpoint

System Requirements

Multimedia service system provides one-stop shopping to the user whichever means of communication pinpointing the user id. Multimedia service System focuses on the

mobility aspects of its business users and the convenience aspects of its residential consumers.

The key elements of Multimedia service system are :

Organisation and presentation :the ability to send information to the users and allocate the respective tools to act on it – to gather requested information on a search, to pay bills, to reply to messages or special offers etc.

Delivery mechanism: Multimedia service System is a bridge between heterogeneous systems and provides a vehicle to the information available of the users and there needs to improve the delivery model for value-added services

New forms of revenues: With dynamic database capabilities, new messaging opportunities can be created to meet users´preferences

The main system requirements are defined as follows:

Access options: includes the ability to initiate and establish a network connection from a user's terminal via a determined network environment. An interface needs to be provided. Depending on the particular accessing terminal the access interface will differ e.g. voice-based. Graphical-based etc. However, the user needs to be presented with the same capabilities and access to the Multimedia service System operation.

Message Storage facility :Multimedia service System needs to integrate and adapt all the complexities / characteristics of different message formats, structures, from multiple sources (sent and received) so that data can be structured, manipulated, accessed, and managed properly.

Management of multiple message types: includes the following features

Efficient handling of messages - filtering, indexing, transmitting, storing etc for selective retrieval based on level of priority (Standby, Express and Priority) ,sender or topic of interest

In-built facilities for reply options –like embedded reply features

Directory handling efficiencies : Organise automatically message type per directory from incoming messages, similar media type, and to reroute unknown connection to

central management. Share directory information and addressing including address books, group lists etc with visiting Multimedia service system or handover.

Delivery management: Handling of undelivered messages, automatic conversion of formats, automatic compression, and encryption where necessary. Allow automatic Push Technology to feed users with continuous corporate news and events when travelling for example in-office Internet access.

Management information reports: involves message tracking, monitoring message traffic, status of media and message transaction

Support of concurrent access : Allowing transmission of more than one media types to be received simultaneously including compound documents (like image and drawings, simultaneous voice and fax etc.) depending on terminal capabilities.

Management of the availability and execution of the message services other than one´s home Multimedia service system and hand over to nearest Multimedia service system in failed condition .

Service personalisation and Creation messages: Service creation tools need to be in place aiming at a wide range of message creation requirements in the selective medium (e.g. create and send voice messages from one´s browser window – which will invoke using the Compose button to get the addressing of the specific recipient and speak through the Multimedia Message terminal to record the message, and once the message is satisfactory, user clicks button to confirm sending instruction) .User is thus provided with user friendly tool to match their message and media applications.

Interoperability :To be able to interoperate with disparate platforms and networks (including internet), a platform need to be supported and needs to be flexible to accommodate standards and emerged technologies. Backward compatibility with previously installed Multimedia service systems and the different media formats need to be supported.

Scalability: Network needs to be scalable enough to meet traffic growth and maintain system performance, satisfying both user needs and revenue.

Network Connectivity: Multimedia service system needs to be compliant with the standards including gateways, protocols conversions , message formats, message structures, and addressing mechanism etc to realise the following :

To enable Seamless transmission between different carriers, providers or operators so that sender or recipient can communicate through access device.

To enable multiple transaction between local or remote locations

To bridge the different networks e.g. IP, and switch networks in an integrated efforts so that user is able to correspond with one another independent of media type (e.g. text-to-speech, delivery of fax messages over internet, text to multimedia (MPEG 7 format) or graphic presentation, etc.)

To support roaming across multiple Multimedia service system

Terminal Adaptation : The limitation and capabilities of the accessing terminals needs to be recognised by the system to enable the users to retrieve, navigate through their message storage, to send or reply to or forward Multimedia messages

Notification : Delivery of messages according to location dependency, or default location, or to be alerted on certain transactions of Multimedia messages with respect to user´s profiles and needs.

Message Negotiation :Sender/Recipient terminal capabilities, to negotiate file type, or to drop to default baseline.

Integration of applications: A customized package of information, message formats, and organisation tools needs to be available to allow some of the following communication capabilities (push technology to expand, telephone terminal for voice mail messaging, send and receive messages worldwide, convert text to speech to be handled by the terminal, receive notification of incoming messages etc.)

Reliability and availability: Reliable, high-speed connections to assure uptime, software –configurable access platforms for quick response to changing access requirements with the different media types.

Operation and administration on and Maintenance: To support user's profiles, feature selections, permissions, flexible charging, and network administration regarding users' information from other networks.

Archiving facilities: Under user's control for both incoming and outgoing messages

Legal obligations (mainly for e-commerce, mobile Commerce etc):

To provide inbuilt facilities for personal/ organisation ID and Digital signatures

To provide electronic postmark including Time ID, Time and Date stamp

To provide Legal status for confirming Multimedia messages

Security:

to maintain registration and allow network access information of users in connecting or accessing Multimedia messages wherever and whenever one may be and whatever terminal type one may use

automatic remote verification of validity and access privileges,

connection restrictions (i.e. number of possible connections at a time)

protocol restrictions (i.e. limiting users to certain protocols o n remote access)

Firewall to protect user and control external access with notification against intruders

Multimedia message management

Terminal-sensitive Multimedia Message management

The Multimedia Message System shall be able to support the capability for the terminal and network to take account of the availability, changes of the state of availability and capability of the user's terminal (e.g. store messages if the recipient is not available or deliver a Multimedia Message / notification in a manner compatible with the terminals capability).

Multimedia service System control

The Multimedia Message System shall be able to support a request to enable/disable Multimedia Message delivery or submission.

Personalise multimedia messaging

The Multimedia service System shall be able to support a request by the user to manage his multimedia messaging (e.g. customise his Multimedia environment within the capabilities of the terminal, network and Multimedia Message application. This could be unconditional or conditional e.g. depending on roaming conditions or operator restrictions).

Multimedia Message creation

The Multimedia service System shall be able to support the request to create a Multimedia Message by the user or an application.

Multimedia Message deletion

The Multimedia service System shall be able to support the request to delete a Multimedia Message once submitted (e.g. recalling a message).

Multiple Media

Multimedia messages may be composed of either a single medium (e.g. voice) or multi-media (e.g. Voice and video). The Multimedia Message System shall be able to support a request for media synchronisation / sequencing.

Media Type Conversion

The Multimedia service System shall be able to support a request to convert between media types (e.g. Fax to image).

Media Format Conversion

The Multimedia service System, shall be able to support a request by the user or the application to convert between Multimedia Message media formats (e.g. JPEG to GIF).

Message content retrieval by the network messaging application

The Multimedia service System shall be able to support a request by the messaging application to retrieve Multimedia Message elements.

Message forwarding

The Multimedia service System shall support the capability to forward multimedia messages or multimedia message elements without having to first download the MM to the terminal.

Storage of Multi-Media Messaging

The Multimedia service System shall support multimedia messages or message elements to be stored until delivered to the recipient's terminal, until they expire, or until they are deleted by the user (unless configured differently).

The Multimedia Message System shall not be responsible for the processing/presentation of the Multimedia message, after it has been delivered to the terminal.

Prioritisation and Screening of Messages

The Multimedia service System shall support a request for Multimedia Message prioritisation and Multimedia Message screening subject to the capabilities of the network or operator (e.g. the sender and recipient of the Multimedia Message may request to prioritise the importance of the multimedia messages or automatically delete "junk mail" without delivery to the recipient's terminal).

Regarding the prioritised delivery and message screening the recipient shall have ultimate control subject to any Multimedia Message screening which is imposed by the network. However, there might be situations where the user should not have ultimate control to the Multimedia Message screening, e. g. at network borders where the operstor specifies general filters to protect his domain.

Multimedia message delivery

Push Mechanism

The Multimedia Message System shall support multimedia messages or messages elements to be automatically delivered to the recipient's terminal.

Pull Mechanism

The Multimedia Message System shall support multimedia messages or messages elements to be delivered to the recipient's terminal on request by the recipient.

Concurrency

The Multimedia Message System shall support Multimedia Message delivery to and from the user's terminal not be restricted during other active services (subject to the capabilities of the terminal and the network).

Delivery delay

The Multimedia Message System shall support minimum delay for message delivery (e.g. for a telemetric service). The Multimedia Message System shall provide the capability to support a validity period for a message (e.g. if a message can not be delivered within a certain time it will be deleted).

Multimedia Message streaming

Notification

The Multimedia Message System shall support generic notification capability to inform the user in an appropriate manner. Possible examples of such notifications may include:

inform the recipient about stored messages (including a description of the message, e.g. content, size, type).

inform the recipient about actions taken by the Multimedia Message System, (e.g. due to profile settings like automatic Multimedia Message forwarding, deletion, etc.)

inform the sender about successful or failed Multimedia Message delivery or storage of Multimedia Message.

Addressing

The Multimedia Message System shall support different addressing formats to identify the sender and recipient where applicable. It shall be possible to submit one message to multiple recipients.

Profile

The Multimedia Message System shall support the ability to create, update, store, transfer, interrogate, manage and retrieve a user's multimedia messaging profiles. The multimedia messaging profiles shall allow a user to configure and personalise his multimedia messaging environment with the multimedia messaging profiles (e.g. which media types and notifications that shall be delivered to the recipient , such as voice only or text only).

Security

The user shall be able to use and access Multimedia Message in a secure manner.

Charging

The Multimedia Message System shall be able to support various charging mechanisms. The following charging characteristics may be considered:-

message types, length, storage time in the network, etc

delivering time, upload / download method,

Multimedia Message-sender / -recipient

number of messages sent

number of messages received

roaming conditions

location conditions

Claims

1. Multimedia service system (1, 2, 3, 4) for receiving, storing and managing messages of different media types received from different communication channels (C1, C2, C3) and for transmitting one or more specific messages to a selected communication device (A, B) via a single common interface of the system.

2. Multimedia service system according to claim 1,
characterized by
a multimedia service unit (1) for managing the messages of different media types received from different communication channels.

3. Multimedia service system according to claim 1 or 2,
characterized in,
that a specific messages is transmitted to a selected communication device automatically on the basis of a respective user profile comprised in the system.

4. Multimedia service system according to claim 3,
characterized by
a user profile unit (3) for managing user profiles in the system.

5. Multimedia service system according to one of the claims 1 to 4,
characterized in,
that a specific message is transmitted to a selected communication device upon a request from the communication device (A, B).

6. Multimedia service system according to one of the claims 1 to 5,
characterized in,
that parameters of a specific message, e.g. format of the message or transmission quality etc., to be transmitted are set to the required settings on the basis of a corresponding set information received from the selected communication device (A, B).

7. Multimedia service system according to one of the claims 1 to 6,
characterized in,
that the transmission of the one or more specific messages to a selected communication device (B) is performed on the basis of a wireless communication system.

8. Multimedia service system according to claim 7,
characterized in,
that the selected communication device (B) is a mobile terminal of a wireless telecommunication system.

9. Multimedia service system according to one of the claims 1 to 6,
characterized in,
that the transmission of the one or more specific messages to a selected communication device (A) is performed on the basis of a wired communication system.

10. Multimedia service system according to one of the claims 1 to 9,
characterized in,
that the one or more specific messages are stored in the selected communication device (A, B) in a memory unit (MU) being detachable from the communication device (A, B) and being adapted to be used with on or more further communication devices or reproducing devices.

11. Multimedia service system according to claim 10,
characterized in,
that said detachable memory unit (MU) comprises authentication information on the basis of which the access of a user to the respective messages is checked.

12. Method for providing multimedia services, whereby messages of different media types are received from different communication channels, stored and managed, and whereby one or more specific messages are transmitted to a selected communication device via a single common interface.

13. Method according to claim 12,
characterized in,
that a specific messages is transmitted to a selected communication device automatically on the basis of a respective user profile.

14. Method according to claim 12 or 13,
characterized in,
that a multimedia service unit manages the messages of different media types received from different communication channels.

15. Method according to claim 14,

characterized in,
that a profile unit manages user profiles in the system.

16. Method according to one of the claims 12 to 15,
characterized in,
that a specific message is transmitted to a selected communication device upon a request from the communication device.

17. Method according to one of the claims 12 to 16,
characterized in,
that parameters of a specific message, e.g. format of the message or transmission quality etc., to be transmitted are set to the required settings on the basis of a corresponding set information received from the selected communication device.

18. Method according to one of the claims 12 to 17,
characterized in,
that the transmission of the one or more specific messages to a selected communication device is performed on the basis of a wireless communication system.

19. Method according to claim 18,
characterized in,
that the selected communication device is a mobile terminal of a wireless telecommunication system.

20. Method according to one of the claims 12 to 17,
characterized in,
that the transmission of the one or more specific messages to a selected communication device is performed on the basis of a wired communication system.

21. Method according to one of the claims 12 to 20,
characterized in,
that the one or more specific messages are stored in the selected communication device in a memory unit being detachable from the communication device and being adapted to be used with on or more further communication devices or reproducing devices.

22. Method according to claim 21,
characterized in,
that the access of a user to the respective messages is checked on the basis of authentication information stored in said detachable memory unit.

23. Computer program product adapted to perform a method according to one of the claims 12 to 22 when installed in one or more computing units of a multimedia service system.

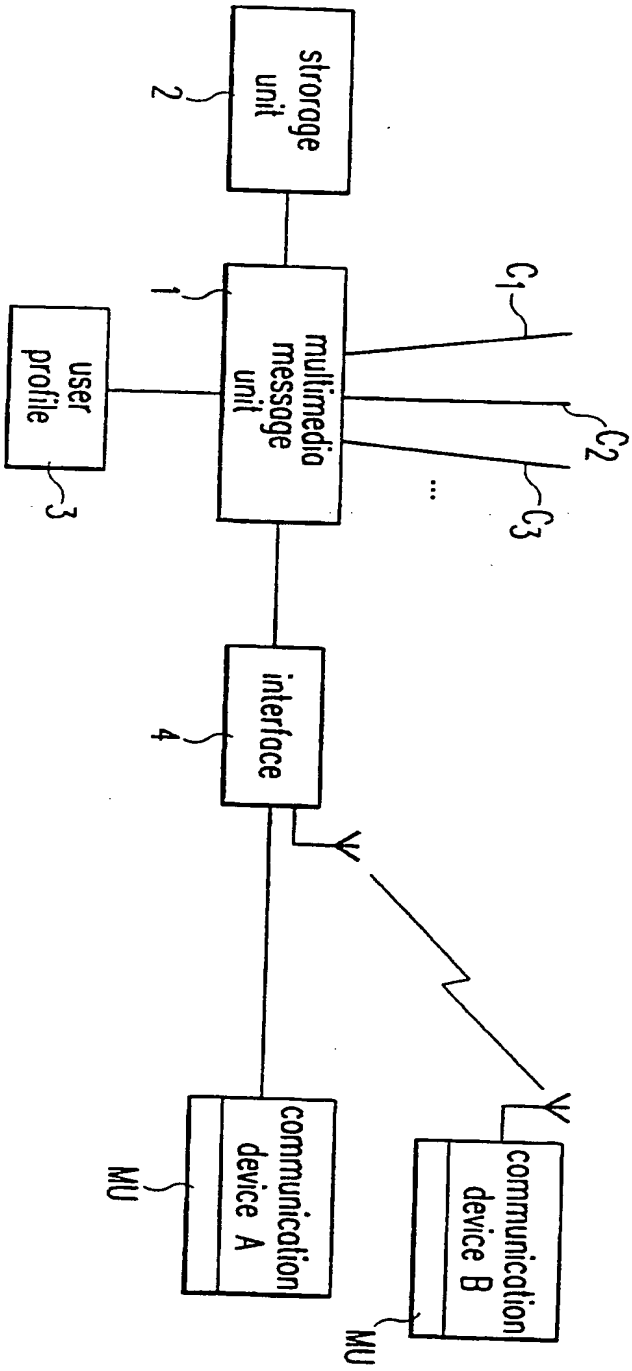

Fig. 1

INTERNATIONAL SEARCH REPORT

Inter. ...lication No
PCT/EP 00/11032

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M3/533 H04Q7/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04M H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5 742 905 A (BROCKMAN JAMES JOSEPH ET AL) 21 April 1998 (1998-04-21) column 5, line 27 -column 8, line 53 figure 3	1-9, 12-20,23 10,21
X Y	WO 98 19438 A (ERICSSON TELEFON AB L M) 7 May 1998 (1998-05-07) page 8, line 3 -page 12, line 22 figure 1	1-9, 12-20,23 10,21
X Y	EP 0 845 894 A (BOSTON TECH INC) 3 June 1998 (1998-06-03) column 2, line 3 -column 3, line 13 column 3, line 45 -column 7, line 47	1-6,9, 12-17, 20,23 10,21

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
3 April 2001	10/04/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gkeli, M

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